The Value of Second Opinion in Dermato-Oncology Using Cellular Phones

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Teledermoscopy is a new tool of telemedicine by which a second opinion from a remote teleconsultant is achieved through store and forward systems. Clinical and dermoscopic images of pigmented skin lesions can be easily transmitted over telecommunication networks (e-mails, specific web applications). Already in 1999 the feasibility of teledermoscopy has been demonstrated by Piccolo et al. revealing a good agreement (91% concordance) between the face to face diagnosis and the remote diagnosis. One year later, in a successive multicentric study these results were confirmed but only when teledermoscopy had been performed by dermatologists confident with dermoscopy. The CNMD (a virtual meeting of experts from all over the world) organized by Argenziano in 2000 was another evident example of the practical applicability of the use of dermoscopy via internet. Remarkably, Braun et al. in 2003 reported that the accuracy of teledermoscopy was even superior to the one obtained on face to face basis. Again in 2003, Guillod et al. presented an open internet platform for cooperative research in this field. Another experience of a specific web application for dermatological consultation also regarding teledermoscopy was published under the title "telederm.org: freely available online consultations in dermatology" (http://www.telederm.org/consulting/2005_telederm.org_PL05.pdf). Recently, we investigated the feasibility of teleconsultation using a new generation of cellular phones in pigmented skin lesions. 18 patients were selected consecutively at our Pigmented Skin Lesions Clinic. Clinical and dermoscopic images were taken using a Sony Ericsson with a built-in 2 megapixel camera with macro mode and zoom. 2 teleconsultants reviewed the images on a specific web application where images had been uploaded in JPEG format. The telediagnoses were then compared to the face-to-face diagnoses. The 2 teleconsultants obtained a score of correct telediagnosis of 95% (data not yet published).

Until now, the validity of teledermoscopy has been shown only in a few studies. We are, however, convinced that teledermoscopy is a promising area for further research and development and will be soon integrated in the daily office workflow for diagnosis and management of equivocal pigmented skin lesions. The use of cellular phones by individuals with pigmented skin lesions for documentation and teleconsulting purposes is currently at its beginning and might have a major impact on the classical referral chain in the future. Teledermoscopy accelerates the empowerment of individuals with pigmented skin lesions representing a citizen-centered approach in accordance with the European eHealth policy and beyond.

http://europa.eu.int/information_society/europe/2005/all_about/ehealth/index_en.htm

What Future for Dermoscopy?

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"We are beginning to move away from clinico-pathologic diagnosis into an era of clinicocamiging diagnosis". That is what June K. Robinson, the editor of Archives of Dermatology, wrote in February 2005. This vision is based on the fact that dermoscopy, among the other imaging techniques that have been developed in the last years, is changing the practice of diagnosing cutaneous disorders, in general, and skin cancer, in particular. The fact that more than 600 papers have been published in the field of dermoscopy in less than 20 years, of those more than 200 in the last 2 years, is one of the strongest evidences proving that this vision is true and dermoscopy is rapidly becoming a standard of care in many countries all over the world. What could dermoscopy be in 2025? Will a dermoscope fill the pocket of all physicians dealing with the diagnosis of skin cancer? Reasonable the answer is yes, at least until an otoscope will be in the pocket of an otolaryngologist! Dermoscopy opened a new morphologic dimension of skin lesions that sooner or later will be discovered by all clinicians dealing with dermatologic disorders. This is because dermoscopy is not only helpful in the field of cutaneous oncology, but also for the diagnosis and treatment monitoring of a growing number of skin disorders, including infectious and inflammatory diseases. Digital documentation is becoming a standard of care in many referral centers and, due to the increasing use of follow up of pigmented skin lesions we will be able to clarify some of the concepts of the nevus life and the biological behaviour of melanoma. Being dermoscopy a subsurface examination linking macroscopic dermatology to microscopic dermatopathology, more and more pathologists will profit of dermoscopy to better diagnose equivocal melanocytic neoplasms. Technology will keep improving and perhaps new devices will be developed to perform total body scanning of the skin to follow patients in a faster and more complete way. Finally, more and more hints not to miss melanoma will be discovered for the biggest vision becoming true: “no one should die on melanoma”.

Dermoscopic Clues in the View of a New Concept of Nevogenesis

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Acquired melanocytic nevi (AMN) show marked age-related differences in their dermoscopic patterns. While globular patterns are mostly found in children’s nevi, AMN in adults commonly exhibit reticular patterns. The differences in dermoscopic patterns among different age groups along with the results obtained by epidemiologic, clinical and histopathologic studies, lead to postulate that small CMN, the globular type of AMN in children and dermal nevi in adults might belong to the same spectrum of “genetically determined” melanocytic nevi, following distinct, eventually endogenous pathways in their evolution and persist during lifetime. By contrast, the dermoscopically reticular and homogenous non blue nevi in adults might represent the “true” AMN, that might develop in response to exogenous factors, such as ultraviolet (UV) – light, and eventually disappear later in life. Albeit this hypothesis is based on only morphologic observation, recent insights into melanoma and nevus genetics indicate further evidence that different melanocytic nevi follow distinct pathways in their evolution. Recently, high rate mutations in B-RAF genes, originally found in melanoma and other cancers, have been identified also in a variable number of AMN and draw attention to B-RAF and its signalling pathways in melanoma progression and nevogenesis. Of particular interest is the fact that B-RAF mutation, although variably expressed in acquired melanocytic proliferations, is not altered in Spitz nevi and blue nevi. Remarkably, Spitz nevi are frequent in children and the latter is commonly considered to be congenital. Even though former studies reported B-RAF alterations in a considerable number of CMN, these data were obtained from histopathologically diagnosed CMN, irrespectively from their clinical history. Remarkably, a very recent study including the clinical history did not confirm these previous findings and found no B-RAF mutations in their series of CMN. Hence it could be emphasized that the wide range of B-RAF mutations reported in AMN might be biased by the inclusion of histopathologic diagnosed AMN without considering their clinical history and/or dermoscopic features. Despite the plenitude of clinical, epidemiological, and histopathologic data, the life cycle of melanocytic nevi remains to be clarified. In this context, dermoscopy might represent an additional source of data for developing new hypothesis on nevogenesis that has to be proven by molecular analysis.

Value of Follow-Up of Pigmented Skin Lesions by Digital Dermatoscopy

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Early recognition of melanoma is a challenge to every dermatologist. If a melanocytic skin lesion is doubtful for melanoma, either by gross inspection or by dermoscopic examination, the lesion is usually excised to rule out the disease. This strategy is adequate for most clinical situations, but it has been shown recently that melanomas and in particular incipient melanomas may lack dermoscopic features specific for this disease. Sequential dermoscopic imaging improves the recognition of these "featureless" melanomas. Before the ERA of digital documentation most cases of incipient melanoma would have been missed initially and would have been excised later in the course of the disease when the criteria for melanoma are more obvious (and when melanoma is more advanced). The indication for follow-up of melanocytic lesions with digital dermoscopy should be considered carefully, and the potential benefits have to be weighed against the potential risks, including the risk of missing a melanoma at the patient’s first visit and the risk of non-compliance of the patient.
Computer Aided Diagnosis of Pigmented Skin Lesions
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During the last two decades early recognition of pigmented skin lesions has been substantially improved. Due to the dramatic evolution of computers, digital image analysis and the development of powerful algorithms for machine learning, the computer aided diagnosis of pigmented skin lesion promises various potential benefits. This development coincides with the design of numerous machines supporting the digital imaging of skin lesion as well as their computer aided classification. The majority of solutions for computer aided diagnosis utilizes information from digital dermoscopic images. An alternative approach uses multispectral imaging, where numerous images are taken in the visible and non-visible frequency range of light. Based on these images a variety of morphometric descriptors is extracted and used for further classification. Different statistical classifiers as well as methods of artificial intelligence, such as artificial neural networks, are used for analysis, giving a probability of class membership. Finally, the user receives a suggestion, a warning where suitable, and in some cases a diagnosis. This review will cover the entire field of computer assisted analysis of pigmented skin lesions, providing an overview on technology, performance but also on benefits and caveats.

In Vivo Reflectance-Mode Confocal Microscopy for Melanoma Diagnosis
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Reflectance confocal microscopy (RCM) is a new tool for the non invasive study of the skin at quasi-histopathologic resolution. By means of RCM, the exact correlation of single dermoscopic patterns with their cytological and architectural substrate has made possible, and diagnostic accuracy may be improved. Different aspects of the pigment network and the degree of architectural and cytological atypia were evidenced by RCM. Pigmented globules were constituted by aggregates of cells, usually located at the dermal-epidermal junction, corresponding to the melanocytic nests at histopathology. Black dots were correlated with refractive keratinocytes or with large cells spreading upwards in a pagetoid fashion. The blue-whitish veil was constituted by numerous pleomorphic cells, corresponding to malignant melanocytes and inflammatory cells. On the other hand, grey-bluish areas were correlated to the presence of plump bright cells within dermal papillae corresponding to melanophages at histopathology. RCM, giving the opportunity to visualise the skin at cellular level resolution, represents the missing link between the clinicians and the pathologists.